

DEVELOPMENT AND TAXONOMIC VALUE OF DORSAL TERTIARY
FRINGE SCALES ON THE WINGS OF ADULT MOSQUITOES
(DIPTERA: CULICIDAE)

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Abstract.—The condition of dorsal tertiary fringe scales on the wings of females and males for numerous species of tribe Aedini and representative species of other culicid tribes and subfamily Anophelinae is noted. With few exceptions the presence or absence of these scales appears to be consistent for species included in well-defined generic-level taxa.

Key Words: Dorsal tertiary fringe scales, wing, Diptera, Culicidae, Anophelinae, Culicinae, Aedini, Aedeomyiini, Culicini, Culisetini, Mansoniini, Orthopodomysiini, Sabethini, Toxorhynchitini, Uranotaeniini

Small, narrow to broad scales inserted parallel or at a slight angle to the dorsal posterior margin of the wings of adult mosquitoes are termed dorsal tertiary fringe scales (DTFS). Only the small scales on the dorsal surface of the posterior margin of the wing are reported herein since the tertiary fringe scales on the ventral posterior margin of the wing are normally reduced in number or completely absent in species possessing DTFS. Harbach and Knight (1980) provided illustrations of DTFS (as tertiary fringe scales), i.e., *Anopheles (Cellia)* (Fig. 17f) and *Culiseta inornata* (Williston) (Fig. 19c,d). Their Figure 17a of *Uranotaenia lowii* Theobald illustrates the absence of DTFS. The DTFS in mosquitoes may be of a uniform color or have pale ones intermixed or in small patches within darker-scaled areas. The DTFS are normally present on the entire

dorsal posterior margin of females but some taxa have these scales totally absent or absent at least on the proximal 0.5 of the wing. These scales are absent in males of numerous culicid taxa but are present in others. The presence or absence and other characteristics of DTFS were found to be of importance in distinguishing species, species groups and generic-level taxa. Unfortunately, these scales are very rarely mentioned in taxonomic descriptions of species or higher-level taxa of Culicidae.

The presence/absence of DTFS on the wing of females and males is indicated for 345 species in Table 1. The table primarily includes species of tribe Aedini but also includes representatives of other tribes and subfamily Anophelinae. Subfamilies and tribes within Culicidae follow the classification outlined by Harbach and Kitching (1998). Generic

Table 1. List of mosquito taxa with or without dorsal tertiary fringe scales.

Species	Female	Male
SUBFAMILY ANOPHELINAE		
<i>Anopheles (Anopheles) atropos</i> Dyar and Knab	+	—
<i>An. (Ano.) barberi</i> Coquillett	+	+
<i>An. (Ano.) bradleyi</i> King	+	—
<i>An. (Ano.) punctipennis</i> (Say)	+	—
<i>An. (Ano.) quadrimaculatus</i> Say	+	—
<i>An. (Cellia) indefinitus</i> (Ludlow)	+	—
<i>An. (Cel.) kochi</i> Dönitz	+	—
<i>An. (Nyssorhynchus) albimanus</i> Weidemann	+	—
SUBFAMILY CULICINAE		
Tribe Aedeomyiini		
<i>Aedeomyia squamiger</i> (Lynch Arribalzaga)	+	+
Tribe Aedini		
<i>Abraedes papago</i> (Zavortink)	+	—
<i>Aedes cinereus</i> Meigen	+	—
<i>Ae. esoensis</i> Yamada	+	—
' <i>Ae. (Aedimorphus) albocephalus</i> (Theobald)	+	—
' <i>Ae. (Adm.) alboscuteatus</i> (Theobald)	+	—
' <i>Ae. (Adm.) apicoannulatus</i> (Edwards)	+	—
' <i>Ae. (Adm.) argenteopunctatus</i> (Theobald)	+	—
' <i>Ae. (Adm.) caecus</i> (Theobald)	+	—
' <i>Ae. (Adm.) culicinus</i> Edwards	+	—
' <i>Ae. (Adm.) cumminsii</i> (Theobald)	+	—
' <i>Ae. (Adm.) dalzieli</i> (Theobald)	+	—
' <i>Ae. (Adm.) dentatus</i> (Theobald)	+	—
' <i>Ae. (Adm.) domesticus</i> (Theobald)	+	—
' <i>Ae. (Adm.) eritreae</i> Lewis	+	—
' <i>Ae. (Adm.) irritans</i> (Theobald)	+	—
' <i>Ae. (Adm.) mediolineatus</i> (Theobald)	+	—
' <i>Ae. (Adm.) ochraceus</i> (Theobald)	+	—
' <i>Ae. (Adm.) orbitae</i> Edwards	+	—
' <i>Ae. (Adm.) pallidostriatus</i> (Theobald)	+	—
' <i>Ae. (Adm.) pampangensis</i> (Ludlow)	+	—
' <i>Ae. (Adm.) pipersalatus</i> (Giles)	+	—
' <i>Ae. (Adm.) punctifemoris</i> (Ludlow)	+	—
' <i>Ae. (Adm.) simulans</i> (Newstead and Carter)	+	—
' <i>Ae. (Adm.) taeniorhynchoides</i> (Christophers)	+	—
' <i>Ae. (Adm.) tarsalis</i> (Newstead)	+	—
' <i>Ae. (Adm.) vexans vexans</i> (Meigen)	+	—
' <i>Ae. (Cnecraedes) masculinus</i> Mattingly	+	—
' <i>Ae. (Can.) penghuensis</i> Lien	+	—
<i>Alanstonea brevitibia</i> (Edwards)	—	—
<i>Albuginosus capensis</i> (Edwards)	+	+
<i>Al. kapretwae</i> (Edwards)	+	+
<i>Al. marshallii</i> (Theobald)	+	+
<i>Al. ngong</i> (van Someren)	+	+
<i>Al. stokesi</i> (Evans)	+	+
<i>Armigeres (Armigeres) breinli</i> (Taylor)	+	—
<i>Ar. (Arm.) subalbatu</i> s (Coquillett)	+	—
<i>Ar. (Lei.) flavus</i> (Leicester)	+	—
<i>Ar. (Lei.) longipalpis</i> (Leicester)	+	—
<i>Ayurakitia griffithi</i> Thurman	+	—
<i>Ay. peytoni</i> (Reinert)	+	—
<i>Aztecaedes ramirezi</i> (Vargas and Downs)	+	—

Table 1. Continued.

Species	Female	Male
<i>Belkininus aurotaeniatus</i> (Edwards)	+	-
<i>Borichinda cavernicola</i> Rattanarithikul and Harbach	+	+
<i>Bothaella eldridgei</i> (Reinert)	+	-
<i>Bo. helenae</i> (Reinert)	+	-
<i>Bruceharrisonius alektorovi</i> (Stackelberg)	+	-
<i>Br. aureostriatus</i> (Doleschall)	+	-
<i>Br. greenii</i> (Theobald)	+	-
<i>Christophersomyia gombakensis</i> (Mattingly)	+	+
<i>Cr. thomsoni</i> (Theobald)	+	+
<i>Collessius banksi</i> (Edwards)	+	-
<i>Co. elsiae</i> (Barraud)	+	-
<i>Co. macclougalli</i> (Edwards)	+	-
<i>Co. macfarlanei</i> (Edwards)	+	-
<i>Co. pseudotaeniatus</i> (Giles)	+	-
<i>Dahliana echinus</i> (Edwards)	+	+
<i>Da. geniculata</i> (Olivier)	+	+
<i>Diceromyia franciscoi</i> (Mattingly)	+	+
<i>Di. furcifer</i> (Edwards)	+	+
<i>Di. iyengari</i> (Edwards)	+	+
<i>Di. meronephada</i> (Dyar and Shannon)	+	+
<i>Di. micropterus</i> (Giles)	+	+
<i>Di. periskelata</i> (Giles)	+	+
<i>Di. reginae</i> (Edwards)	+	+
<i>Di. scanloni</i> (Reinert)	+	+
<i>Di. taylori</i> (Edwards)	+	+
<i>Di. whartoni</i> (Mattingly)	+	+
<i>Dobrotworskyius alboannulatus</i> (Macquart)	+	-
<i>Db. rubrithorax</i> (Macquart)	+	-
<i>Db. tubbutiensis</i> (Dobrotworsky)	+	-
<i>Downsionyia harinasutai</i> (Knight)	+	-
<i>Do. leonis</i> (Colless)	+	-
<i>Do. nipponica</i> (LaCasse and Yamaguti)	+	-
<i>Do. nivea</i> (Ludlow)	+	-
<i>Do. vanua</i> (Colless)	+	-
<i>Edwardsaedes bekkui</i> (Mogi)	+	-
<i>Ed. imprimens</i> (Walker)	+	-
<i>Eretmapodites chrysogaster</i> Graham	+	-
<i>Er. dracaenae</i> Edwards	+	-
<i>Er. inornatus</i> Newstead	+	-
<i>Er. penicillatus</i> Edwards	+	-
<i>Er. quinquevittatus</i> Theobald	+	-
<i>Finlaya fijiensis</i> (Marks)	+	+
<i>Fl. franclemonti</i> (Belkin)	+	+
<i>Fl. gahnicola</i> (Marks)	+	+
<i>Fl. knighti</i> (Stone and Bohart)	+	+
<i>Fl. kochi</i> (Dönitz)	+	+
<i>Fl. poicilia</i> Theobald	+	-
<i>Fl. wallacei</i> (Edwards)	+	+
<i>Fredwardsius vittatus</i> (Bigot)	+	-
<i>Georgecraigius (Georgecraigius) atropalpus</i> (Coquillett)	+	+
<i>Ge. (Gec.) epactius</i> (Dyar and Knab)	+	-
<i>Ge. (Horsfallius) fluviatilis</i> (Lutz)	+	-
<i>Geoskusea baisasi</i> (Knight and Hull)	+	-
<i>Ge. fimbripes</i> (Edwards)	+	-
<i>Ge. longiforceps</i> (Edwards)	+	-

Table 1. Continued.

Species	Female	Male
<i>Gilesius pulchriventer</i> (Giles)	+	-
<i>Gymnometopa mediovitata</i> (Coquillett)	+	-
<i>Haemagogus (Conopostegus) leucocelaenus</i> (Dyar and Shannon)	+	-
<i>Hg. (Con.) leucotaeniatus</i> (Komp)	+	-
<i>Hg. (Haemagogus) equinus</i> Theobald	-	-
<i>Hg. (Hag.) lucifer</i> (Howard, Dyar and Knab)	-	-
<i>Hg. (Hag.) splendens</i> Williston	-	-
<i>Halaedes australis</i> (Erichson)	+	+
<i>Heizmannia (Heizmannia) complex</i> (Theobald)	+	+
<i>Hz. (Hez.) scintillans</i> Ludlow	+	+
<i>Hz. (Mattinglyia) achaetae</i> (Leicester)	+	+
<i>Himalaius gilli</i> (Barraud)	+	-
<i>Howardina albonotata</i> (Coquillett)	+	-
<i>Hw. fulvithorax</i> (Lutz)	+	-
<i>Hw. sexlineata</i> (Theobald)	+	-
<i>Hw. walkeri</i> (Theobald)	+	-
<i>Hw. whitmorei</i> (Dunn)	+	-
<i>Huaedes wauensis</i> (Huang)	+	-
<i>Hulecoeteomyia chrysolineata</i> (Theobald)	+	-
<i>Hl. harveyi</i> (Barraud)	+	-
<i>Hl. saxicola</i> (Edwards)	+	-
<i>Hl. sherki</i> (Knight)	+	-
<i>Isoaedes cavaticus</i> (Reinert)	+	-
<i>Jarnellius (Jarnellius) deserticola</i> (Zavortink)	+	+
<i>Ja. (Jar.) monticola</i> (Belkin and McDonald)	+	+
<i>Ja. (Jar.) sierrensis</i> (Ludlow)	+	+
<i>Ja. (Jar.) varipalpus</i> (Coquillett)	+	+
<i>Ja. (Lewnielsenius) muelleri</i> (Dyar)	+	-
<i>Jihlienius chungii</i> (Lien)	+	-
<i>Kenknightia dissimilis</i> (Leicester)	+	-
<i>Ke. harbachi</i> (Reinert)	+	-
<i>Kompia purpureipes</i> (Aitken)	+	-
<i>Leptosomatomyia aurimargo</i> (Edwards)	+	-
<i>Levua geoskusea</i> (Amos)	+	+
<i>Lorrainea amesii</i> (Ludlow)	+	+
<i>Lo. dasyorrrhus</i> (King and Hoogstraal)	+	+
<i>Lo. fumida</i> (Edwards)	+	+
<i>Macleaya (Chaetocruionymia) elchoensis</i> (Taylor)	+	-
<i>Mc. (Cha.) wattensis</i> (Taylor)	+	-
<i>Mc. (Macleaya) tremula</i> Theobald	+	-
<i>Molpenyia auridorsum</i> (Edwards)	+	-
<i>Mo. pecuniosa</i> (Edwards)	+	-
<i>Mucidus (Mucidus) alternans</i> (Westwood)	+	-
<i>Mu. (Muc.) laniger</i> (Wiedemann)	-	-
<i>Mu. (Muc.) scatophagoides</i> Theobald	+	-
<i>Mu. (Pardomyia) a. aurantius</i> (Theobald)	-	-
<i>Mu. (Pdo.) painei</i> (Knight)	-	-
<i>Mu. (Pdo.) quadripunctis</i> (Ludlow)	-	-
<i>Neomelaniconion lineatopenne</i> (Ludlow)	+	-
<i>Ne. palpale</i> Newstead	+	-
<i>Ochlerotatus (Rusticoidus) bicristatus</i> (Thurman and Winkler)	+	-
<i>Oc. (Rus.) refiki</i> (Medschid)	+	-
<i>Oc. (Rus.) rusticus</i> (Rossi)	+	-
<i>Oc. atlanticus</i> (Dyar and Knab)	+	-
<i>Oc. communis</i> (de Geer)	+	-

Table 1. Continued.

Species	Female	Male
<i>Oc. dorsalis</i> (Meigen)	+	-
<i>Oc. fulvus fulvus</i> (Wiedemann)	-	-
<i>Oc. fulvus pallens</i> (Ross)	-	-
<i>Oc. infirmatus</i> (Dyar and Knab)	+	-
<i>Oc. scapularis</i> (Rondani)	+	-
<i>Oc. sollicitans</i> (Walker)	+	-
<i>Oc. (Finlaya) biocellatus</i> (Taylor)	+	-
<i>Oc. (Fin.) candidoscutellum</i> (Marks)	+	-
<i>Oc. (Fin.) crossi</i> (Lien)	+	-
<i>Oc. (Fin.) embuensis</i> (Edwards)	+	-
<i>Oc. (Fin.) ingrani</i> (Edwards)	+	-
<i>Oc. (Fin.) keefeii</i> (King and Hoogstraal)	+	-
<i>Oc. (Fin.) roai</i> (Belkin)	+	-
<i>Oc. (Ochlerotatus) aculeatus</i> (Theobald)	-	-
<i>Oc. (Och.) albifasciatus</i> (Macquart)	+	-
<i>Oc. (Och.) andersoni</i> (Edwards)	+	-
<i>Oc. (Och.) aurifer</i> (Coquillett)	+	-
<i>Oc. (Och.) caballus</i> (Theobald)	+	-
<i>Oc. (Och.) calcariae</i> (Marks)	+	-
<i>Oc. (Och.) calumnior</i> (Belkin, Heinemann and Page)	-	-
<i>Oc. (Och.) campestris</i> (Dyar and Knab)	+	-
<i>Oc. (Och.) c. canadensis</i> (Theobald)	+	-
<i>Oc. (Och.) cantans</i> (Meigen)	+	-
<i>Oc. (Och.) cantator</i> (Coquillett)	+	-
<i>Oc. (Och.) caspius</i> (Pallas)	+	-
<i>Oc. (Och.) cataphylla</i> (Dyar)	+	-
<i>Oc. (Och.) diantaeus</i> (Howard, Dyar and Knab)	+	+
<i>Oc. (Och.) dupreei</i> (Coquillett)	+	-
<i>Oc. (Och.) edgari</i> (Stone and Rosen)	+	-
<i>Oc. (Och.) excrucians</i> (Walker)	+	-
<i>Oc. (Och.) fitchii</i> (Felt and Young)	+	-
<i>Oc. (Och.) flavescens</i> (Muller)	+	-
<i>Oc. (Och.) flavifrons</i> (Skuse)	+	-
<i>Oc. (Och.) grossbecki</i> (Dyar and Knab)	+	-
<i>Oc. (Och.) hexodontus</i> (Dyar)	+	-
<i>Oc. (Och.) hortator</i> (Dyar and Knab)	+	-
<i>Oc. (Och.) impiger</i> (Walker)	+	-
<i>Oc. (Och.) implicatus</i> (Vockeroth)	+	-
<i>Oc. (Och.) increpitus</i> (Dyar)	+	-
<i>Oc. (Och.) intrudens</i> (Dyar)	+	-
<i>Oc. (Och.) mcdonaldii</i> (Belkin)	-	-
<i>Oc. (Och.) milleri</i> (Dyar)	+	-
<i>Oc. (Och.) mitchellae</i> (Dyar)	+	-
<i>Oc. (Och.) nevadensis</i> (Chapman and Barr)	+	-
<i>Oc. (Och.) nigripes</i> (Zetterstedt)	+	-
<i>Oc. (Och.) nigrithorax</i> (Macquart)	+	-
<i>Oc. (Och.) nigromaculis</i> (Ludlow)	+	-
<i>Oc. (Och.) niphadopsis</i> (Dyar and Knab)	+	-
<i>Oc. (Och.) pemai</i> (Antunes and Lane)	-	-
<i>Oc. (Och.) pertinax</i> (Grabham)	+	-
<i>Oc. (Och.) pionips</i> (Dyar)	+	-
<i>Oc. (Och.) pullatus</i> (Coquillett)	+	-
<i>Oc. (Och.) punctator</i> (Kirby)	+	-
<i>Oc. (Och.) ratcliffei</i> (Marks)	+	-
<i>Oc. (Och.) riparius</i> (Dyar and Knab)	+	-

Table 1. Continued.

Species	Female	Male
<i>'Oc. (Och.)' schizopinax</i> (Dyar)	+	—
<i>'Oc. (Och.)' serratus</i> (Theobald)	+	—
<i>'Oc. (Och.)' spencerii</i> (Theobald)	+	—
<i>'Oc. (Och.)' spilotus</i> (Marks)	—	—
<i>'Oc. (Och.)' squamiger</i> (Coquillett)	+	—
<i>'Oc. (Och.)' sticticus</i> (Meigen)	+	—
<i>'Oc. (Och.)' stimulans</i> (Walker)	+	—
<i>'Oc. (Och.)' taeniorhynchus</i> (Wiedemann)	+	—
<i>'Oc. (Och.)' thibaulti</i> (Dyar and Knab)	+	+
<i>'Oc. (Och.)' trivittatus</i> (Coquillett)	+	—
<i>'Oc. (Och.)' vigilax</i> (Skuse)	+	—
<i>'Oc. (Protomacleaya)' brelandi</i> (Zavortink)	+	—
<i>'Oc. (Pro.)' burgeri</i> (Zavortink)	+	—
<i>'Oc. (Pro.)' galindoi</i> (Schick)	+	—
<i>'Oc. (Pro.)' hendersoni</i> (Cockerell)	+	—
<i>'Oc. (Pro.)' homoeopus</i> (Dyar)	+	—
<i>'Oc. (Pro.)' kompi</i> (Vargas and Downs)	+	—
<i>'Oc. (Pro.)' terrenus</i> (Walker)	+	—
<i>'Oc. (Pro.)' triseriatus</i> (Say)	+	+
<i>'Oc. (Pro.)' zoosophus</i> (Dyar and Knab)	+	—
<i>Opifex (Nothoskusea) chathamicus</i> (Dumbleton)	+	+
<i>Op. (Opifex) fuscus</i> Hutton	+	+
<i>Paraedes barraudi</i> Edwards	+	—
<i>Pr. chrysoseuta</i> (Theobald)	+	—
<i>Pr. ostentatio</i> (Leicester)	+	—
<i>Pr. thailandensis</i> (Reinert)	+	—
<i>Patmarksia argyronotum</i> (Belkin)	+	—
<i>Pm. hollandia</i> (King and Hoogstraal)	+	—
<i>Pm. novalbitarsis</i> (King and Hoogstraal)	+	—
<i>Pm. palmarum</i> (Edwards)	+	—
<i>Pm. papuensis</i> (Taylor)	+	—
<i>Phagomyia assamensis</i> (Theobald)	+	—
<i>Ph. gubernatoris</i> (Giles)	+	—
<i>Ph. khazani</i> (Edwards)	+	—
<i>Ph. lophoventralis</i> (Theobald)	+	—
<i>Ph. prominens</i> (Barraud)	+	—
<i>Pseudarmigeres argenteoventralis dumni</i> (Evans)	+	—
<i>Pa. michaelikati</i> (van Someren)	+	—
<i>Pseudoskusea bancroftiana</i> (Edwards)	+	—
<i>Pk. postspiraculosa</i> (Dobrotworsky)	+	+
<i>Psorophora (Grabhamia) columbiae</i> (Dyar and Knab)	+	—
<i>Ps. (Gra.) jamaicensis</i> Theobald	+	—
<i>Ps. (Janthinosoma) cyanescens</i> (Coquillett)	—	—
<i>Ps. (Jan.) ferox</i> (von Humboldt)	—	—
<i>Ps. (Jan.) horrida</i> (Dyar and Knab)	—	—
<i>Ps. (Psorophora) ciliata</i> (Fabricius)	—	—
<i>Ps. (Pso.) howardii</i> Coquillett	—	—
<i>Ps. (Pso.) lineata</i> (von Humboldt)	—	—
<i>Rampamyia albilabris</i> (Edwards)	+	+
<i>Ra. notoscripta</i> (Skuse)	+	—
<i>Rhinoskusea longirostris</i> (Leicester)	—	—
<i>Rh. wardi</i> (Reinert)	—	—
<i>Scutomyia albolineata</i> Theobald	+	—
<i>Sc. arboricola</i> (Knight and Rozeboom)	+	—
<i>Sc. boharti</i> (Knight and Rozeboom)	+	—

Table 1. Continued.

Species	Female	Male
<i>Skusea pambaensis</i> (Theobald)	+	-
<i>Stegomyia aegypti</i> (Linnaeus)	+	-
<i>St. africana</i> Theobald	+	-
<i>St. albopicta</i> (Skuse)	+	-
<i>St. annandalei</i> Theobald	+	-
<i>St. apicoargentea</i> Theobald	+	-
<i>St. bromeliae</i> Theobald	+	-
<i>St. craggi</i> Barraud	+	-
<i>St. deboeri</i> (Edwards)	+	-
<i>St. dendrophila</i> (Edwards)	+	-
<i>St. desmotes</i> Giles	+	-
<i>St. g. gardnerii</i> Ludlow	+	-
<i>St. luteocephala</i> Newstead	+	-
<i>St. mediopunctata</i> Theobald	+	-
<i>St. metallica</i> (Edwards)	+	-
<i>St. perplexa</i> Leicester	+	-
<i>St. poweri</i> Theobald	+	-
<i>St. riversi</i> (Bohart and Ingram)	+	-
<i>St. scutellaris</i> (Walker)	+	-
<i>St. simpsoni</i> Theobald	+	-
<i>St. unilineata</i> (Theobald)	+	-
<i>St. w-albus</i> Theobald	+	-
<i>Tanakaius savoryi</i> (Bohart)	+	-
<i>Ta. togoi</i> (Theobald)	+	+
<i>Tewarius agastyai</i> (Tewari and Hiriyan)	+	-
<i>Te. reubenae</i> (Tewari and Hiriyan)	+	-
<i>Udaya argyrurus</i> (Edwards)	+	-
<i>Ud. lucaris</i> Macdonald and Mattingly	+	-
<i>Vansomerenis luteostriata</i> (Robinson)	+	+
<i>Va. pulchrithorax</i> (Edwards)	+	+
<i>Verrallina (Harbachius) nobukonis</i> (Yamada)	-	-
<i>Ve. (Har.) yusafi</i> (Barraud)	-	-
<i>Ve. (Neomacleaya) agrestis</i> (Barraud)	-	-
<i>Ve. (Nma.) indica</i> (Theobald)	-	-
<i>Ve. (Nma.) pseudomediofasciata</i> (Theobald)	-	-
<i>Ve. (Nma.) yerburyi</i> (Edwards)	-	-
<i>Ve. (Verrallina) butleri</i> (Theobald)	+	-
<i>Ve. (Ver.) carmentis</i> (Edwards)	+	-
<i>Ve. (Ver.) dux</i> (Dyar and Shannon)	+	-
<i>Ve. (Ver.) hugubris</i> (Barraud)	+	-
<i>Zavortinkius fulgens</i> (Edwards)	+	-
<i>Za. longipalpis</i> (Grunberg)	+	-
<i>Zeugomyia gracilis</i> Leicester	+	-
<i>Ze. lawtoni</i> Baisas	+	-
Tribe Culicini		
<i>Culex (Culex) nigripalpus</i> Theobald	+	-
<i>Cx. (Cux.) quinquefasciatus</i> Say	+	-
<i>Cx. (Cux.) restuans</i> Theobald	+	-
<i>Cx. (Melanoconion) pilosus</i> (Dyar and Knab)	+	-
<i>Cx. (Neoculex) territans</i> Walker	+	-
<i>Deinocerites cancer</i> Theobald	+	+
<i>De. mathesoni</i> Belkin and Hogue	+	+
<i>De. pseudus</i> Dyar and Knab	+	+
Tribe Culisetini		
<i>Culiseta (Allotheobaldia) longiareolata</i> (Macquart)	+	-

Table 1. Continued.

Species	Female	Male
<i>Cs. (Climacura) melanura</i> (Coquillett)	+	+
<i>Cs. (Culicella) morsitans</i> (Theobald)	+	–
<i>Cs. (Culiseta) alaskaensis</i> (Ludlow)	+	–
<i>Cs. (Cus.) incidens</i> (Thomson)	+	–
<i>Cs. (Cus.) inornata</i> (Williston)	+	–
Tribe Mansonini		
<i>Coquillettidia (Coquillettidia) perturbans</i> (Walker)	+	–
<i>Mansonia (Mansonia) indubitans</i> Dyar and Shannon	+	–
<i>Ma. (Man.) titillans</i> (Walker)	+	–
<i>Ma. (Mansonioides) africana</i> (Theobald)	+	–
<i>Ma. (Mnd.) uniformis</i> (Theobald)	+	–
Tribe Orthopodomyiini		
<i>Orthopodomyia signifera</i> (Coquillett)	+	+
Tribe Sabethini		
<i>Malaya genurostris</i> Leicester	+	+
<i>Maorigoeldia argyropus</i> (Walker)	+	+
<i>Sabethes (Sabethes) tarsopus</i> Dyar and Knab	+	+
<i>Trichoprosopon (Trichoprosopon) digitatum</i> (Rondani)	+	–
<i>Tripteroides (Rachionotomyia) aranoioides</i> (Theobald)	+	–
<i>Wyeomyia (Wyeomyia) mitchellii</i> (Theobald)	+	+
<i>Wy. (Wyo.) vanduzeei</i> Dyar and Knab	+	+
Tribe Toxorhynchitini		
<i>Toxorhynchites (Lynchiella) r. rutilus</i> (Coquillett)	–	–
Tribe Uranotaeniini		
<i>Uranotaenia (Pseudoficalbia) anhydor</i> Dyar	+	–
<i>Ur. (Uranotaenia) lowii</i> Theobald	–	–
<i>Ur. (Ura.) sapphirina</i> (Osten Sacken)	–	–

and subgeneric placement of species within tribe Aedini follows Reinert et al. (2004, 2006). Species of uncertain taxonomic position (*incertae sedis*) listed as such in Appendix 4 of Reinert et al. (2006) have the generic-level names enclosed in single quotation marks, e.g., ‘*Ochlerotatus (Finlaya)*’ and ‘*Ochlerotatus (Ochlerotatus)*’. The abbreviations of aedine genera and subgenera are from Appendix 5 of Reinert et al. (2006), and those of non-aedine genera and subgenera are from Reinert (2001). Presence of DTFS on the proximal 0.5 of the wing is indicated by a plus sign (+) and their absence on the proximal 0.5 by a minus sign (–) in Table 1.

Dorsal tertiary fringe scales occur in both females and males of *Corethrella appendiculata* Grabham (Corethrellidae) and *Chaoborus (Sayomyia) punctipennis*

(Say) (Chaoboridae), taxa that are related to Culicidae.

Based on the information in Table 1, the presence or absence of DTFS appears to be consistent for females and males of species included in well-defined subgenera and genera of Culicidae, especially in tribe Aedini, with few exceptions, e.g., *Pseudoskusea* and *Tanakaius*. Variability within *Ochlerotatus sensu lato* may be due to the inclusion of species in groups, subgenera, or genera that are not monophyletic. Additional studies are underway to resolve this issue.

Three conditions of DTFS are discernable for species listed in Table 1: both females and males with scales absent on the proximal 0.5, e.g., *Al. brevitibia*, *Hg. (Haenagogus)*, *Mu. (Pardomyia)*, *Ps. (Psorophora)*, and subgenera *Harbachius* and

Neomacleaya of *Verrallina*; females with scales present and males with scales absent on the proximal 0.5, e.g., *Aedes*, *Armigeres*, *Collessius*, *Howardina*, and *Zavortinkius*; and both females and males with scales present on the proximal 0.5, e.g., *Albuginosus*, *Christophersomyia*, *Dahliaana*, *Halaedes*, and *Heizmannia*.

The DTFS are of a uniform color in most culicid taxa, e.g., *Ae. cinereus*, *Gc. (Gec.) atropalpus*, *Gy. mediovittata*, *Ja. (Jar.) varipalpus*, and *Oc. infirmatus*. In some taxa, however, pale scales or patches are intermixed with dark scales, e.g., '*Ae. (Adm.) pipersalatus*, *Ad. squamiger*, *An. (Nys.) albimanus*, *Cq. (Coq.) perturbans*, *Fl. kochi*, *Mu. (Muc.) alternans*, '*Oc. (Och.) campestris*, and *Ps. (Gra.) columbiae*.

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